not simply on the border-land where the sciences appear to come in contact, but also because it may penetrate the whole area of a science. Perhaps the time is not far distant when we shall cease to speak of "a science," and the unity of *science*, already begun to be recognised in the elementary schools, will be universally acknowledged. It has been stated that when two Sections meet in common the attendance is greater than the sum of the attendances at the separate meetings of the same Sections. This indicates the need, and the direction in which to look for improvement. On the other hand, the Association is mainly responsible for making known to the public the recent advances in science and their bearing on social life—in other words, their possible practical applications. To this end representatives of each Section should be annually appointed for the task of reporting to the next meeting, in terms which will appeal to the man in the street, the progress which has been made in the advancement of science and its applications. It has even been suggested that two sets of reports should be prepared in this way, one as described and the other for experts, and that these reports should form the chief material for the meeting, not much encouragement being offered to original papers suitable for their respective societies. In the preparation of these reports there should be much intercourse between the representatives of the several Sections, and many of them should be the result of joint work. In some cases distinguished investigators should be invited to describe their results in popular language, irrespective of previous publication in the transactions of learned societies. The advancement of science depends not only on the skill and genius of the expert, but also on the appreciation of the people.

September 24. Wm. Garnett.

As one who regularly attends the meetings of the British Association, and in particular those of Section A, may I be allowed to state that I cannot recall in the last twenty years any meeting of the Association when the attendances at Section A were more numerous than at Cardiff. On several occasions it was almost impossible to obtain a seat in the large lecture hall assigned for our meetings unless one came in good time. This was particularly the case when the discussion took place on the constitution of the atom, so admirably exposed by Dr. Aston and by Sir E. Rutherford. A very large audience also assembled to hear Sir Oliver Lodge's controversial note on popular relativity, and the room was full for the discussion on the origin of spectra. And, too, the majority of those who attended, or at least a very large proportion, were not professional physicists, but members of the Association who take an interest in science in general, and who came to hear about the latest advances in physical science. It is for these members that the Association caters, and it would seem that, so far as Section A is concerned, it is fulfilling its functions quite admirably.

This testimony as to the efficiency of the Association may serve as an antidote to some of the jeremiads as to the decadence of the Association which have appeared in the columns of Nature. The only drawback to the complete success of Section A was that some of the speakers did not seem to realise the very indifferent acoustical properties of the hall in which our meetings were held.

The relatively meagre attendance at the two evening discourses was accounted for by the local strike of tramwaymen. This made it difficult to get to distant parts of the city when the discourses were finished. A. L. Cortie.

Stonyhurst College Observatory, September 25.

In your leading article in Nature of September 16 you have expressed what many of us have long felt: that the British Association is losing its interest for the people of the locality in which it meets. This is mainly on account of the highly technical character of most of the papers, which are suitable only for meetings of the special societies. The Association should not be regarded as a means of publishing new observations unless these are of fundamental importance. Its object is rather to give an opportunity for the local worker to exchange ideas with those who are more favourably placed. Again, the laboratory worker may come in contact with the practical man in many subjects to the benefit of both. Another useful function it may perform is in the discussion of border-land subjects in which more than one Section may be interested, and which do not lie definitely within the limits of any one of the special societies. In these functions, the extension of scientific interest to wider classes of the community and the removal of the barriers between different sets of scientific observers, the Association may meet a crying need of the time. Arthur R. Cushny.

University of Edinburgh, September 27.

Uses for Aircraft.

When in the year 1912 I gave the first of the James Forrest lectures on aerial flight, I said that the chief uses of aircraft would probably be for the purposes of war or for sport. As a member of the Advisory Committee for Aeronautics I have been in a position to follow the various developments which have been made since that date, but I see no reason to alter my opinion. While the cost of carriage by air is as high as it necessarily must be at present, the commercial use of aircraft on any considerable scale seems impossible. There is no difficulty in carrying goods; the difficulty is to find any class of goods which, for the sake of halving the time of transit, will bear the increased cost of carriage. A certain small amount of postal work, with a few passengers, so long as the novelty is an attraction, or in special cases, seems to be the only opening. If the ton-mile cost could be reduced to as many farthings as it now is shillings, commercial uses on a much enlarged scale would be found.

For sport and private use (*i.e.* for air-yachts) the existing patterns of machines would have to be altered to allow of a greater range of speed and a greater facility in getting off and landing. Both these objects could be attained by the introduction of wings of variable area. It would be a great advantage also, both for storage and in other ways, if the wings could be properly folded (not merely unshipped and turned back) by the pilot from his seat. I have shown in another place how this might be done for monoplanes, and for these the necessary mechanism is simple. For biplanes it would be more difficult to design, but not impossible.

Among the more special uses of aircraft may be mentioned those of map-making and exploration in difficult countries, and of obtaining information regarding winds and other meteorological matters at various altitudes.

For exploring purposes the machine should be amphibian. In New Guinea, for instance, it is only at a few places on the coast that it would be possible to come down and get off on land not previously cleared, but many of the rivers reach far inland, and (judging from photographs) places could be found even near the mountains where there is a water-surface sufficient for the purpose, provided that the machine has great climbing capacity and a wide range of speed

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An expedition which had aeroplanes at command would have the advantage of photographic maps of the whole district it proposed to explore, and could therefore choose the best routes. Supplies also, which would take days to carry by canoes and porters, might be brought from the coast by air in a few hours; and one has only to read the accounts of previous expeditions to realise what a difference it would have made in the results had the geography of the country been known in advance and had there been no fear of scarcity of provisions.

Among the many ways in which aircraft could help in meteorology, not the least useful would be an examination of the trade winds, especially as regards their variations in altitude and their vertical components in different latitudes. At the present time not much more is known about these winds than their velocities and distribution on the earth's surface.

Exploration and meteorology are scarcely, or only indirectly, commercial matters, and comparatively few aircraft would be required for the purposes suggested, but results of great value might be obtained by their use.

A. MALLOCK.

September 21.

Minerals Hitherto Unknown in Derbyshire.

DURING the past three years I have been conducting investigations relating to the mineralogy of Derbyshire, checking and confirming (or contradicting) asserted occurrences, surveying mineral deposits, and also prospecting, with the result that several minerals—chiefly of scientific interest only—hitherto unknown in Derbyshire have been discovered. The work is not quite completed, and I have not yet issued any paper or other publication upon it, but the following observations may be worth putting on record now:

Zaratite, Nickel-ore.—Samples of this mineral, of a pale emerald-green colour, and usually containing a large quantity of hydrozincite, were recently found in old dumps of decomposed dolerite raised during the early working of a local mine driven in search of lead-ore. When following up the search for further nickel, some nickeliferous hydrozincite (or zinciferous zaratite) was found which was of a blue colour instead of the pure green of zaratite. On analysis this was found to contain *cobalt*, which probably existed as *remingtonite*, the accompanying zinc and nickel existing as their hydrous carbonates. The "mineral" is, therefore, probably a mixture of the three mineral species, hydrozincite, zaratite, and remingtonite.

Considerable difficulty attaches to the following up of such finds with the view of ascertaining the quantity available, as many of these mines are of considerable antiquity and dilapidation, having been driven in search of lead-ore when little or nothing was known of the rarer metals.

Nephrite, Jade.—Near the margin of a basalt quarry at Bonsall a somewhat lenticular nodule-shaped lump of white nephrite was found.

Diabantite.—Beautiful specimens of this uncommon member of the chlorite group of complex silicates were found at Mill Close Mine, Darley Dale, having been raised during the early working of the mine. It occurs in the much decomposed dolerite as radiated spherical aggregates (up to 2 cm. diameter) and of a dark green colour. It is usually associated with calcite in amygdaloidal cavities, has a specific gravity of 2·79, a hardness of 2·3, and is strongly pleochroic.

Cimolite.—A hydrous aluminium silicate. A thin bed of this mineral occurs near Hopton. It is quite white, amorphous, and chalk-like.

Allophane.—A hydrous aluminium silicate. Many of the numerous rake-veins in the mountain limestone of the Middle Peak region are rich in forms of limonite, but chiefly the earthy variety—ochre. In one of these veins which is cut in the Coal Hills Quarry, near Wirksworth, allophane is to be found in more than one form. The commonest form is that of a light amorphous powder; it also occurs as an opaque, white encrustation, and as a translucent, subcrystalline encrustation of the faintest green tinge due to the presence of a minute trace of malachite.

Utahite (?).—The limestone-shale in the vicinity of Wensley contains a quantity of an insoluble basic ferric sulphate as dull, yellowish-brown films in the shale. Its mode of occurrence renders its accurate analysis difficult, but it seems to be a variety of utahite.

Native Sulphur.—"Native sulphur is said to have been found" is recorded by ancient writers, but no confirmation in recent years seems to have been made. A good specimen was recently found near Eyam. It is a greyish-yellow powder, burning readily when ignited.

Manganese-ore.—Manganese is not a new discovery; the indefinite hydrous oxide—wad—has long been known to exist in certain districts in the county. It has also been previously worked, but the present scarcity (recently mentioned in the House of Commons) led to the work of prospecting for a deposit to be mined on as large a scale as possible. This work has been successful, and arrangements are being made, by the company for which the work was undertaken, for the mining of the ore.

C. S. GARNETT.

Riber View, Oak Road, Matlock,
September 16.

Wheat-bulb Disease.

IN view of their economic bearing and of the nearness of the wheat-sowing season, the data given below should be widely known, all the more that in the latest notice I have seen regarding the life-history of the insect pest concerned (*Rev. Applied Entom.*, June, 1920, abstract of papers by R. Kleine in *Zeitschr. f. angew. Entom.*, Berlin, 1915–16) the practical conclusions given appear to be entirely misleading. These conclusions are that "wheat should be preceded by root crops" and "it is apparently useless to attempt to grow wheat or rye on ground which has not been under cultivation for some time." Now it is chiefly among root crops, especially potatoes, and on fallow ground that the insect elects to lay its eggs. This month, for example, in one infected area I find that the number of potential "wheat-bulb" larvæ in a particular potato-field ranges from six to twenty per square foot of surface, while the next field (pasture) has very few, and the neighbouring wheat-field, which was the sufferer last spring, has still fewer. Obviously to sow wheat on infected ground means laying up progressive trouble for the future. The disease has done much damage this year in the East of Scotland and elsewhere, and is evidently spreading, in this locality at any rate. Larvæ obtained from infected wheat were allowed to pupate in the laboratory here, and the flies which hatched out (*Hylemyia coarctata, vide* Theobald's "Agricultural Zoology," 1913, p. 242) were kept until they laid their eggs. (Two of them still survive, though the field Hylemyias are all apparently dead.) The distribution of the eggs in nature was then studied (so far as time allowed) by a method permitting accurate enumeration.

JAMES F. GEMMILL.

Natural History Department, University
College, Dundee, September 23.

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